Building Services Engineering offers a lot of potential on energy efficency improvement. The following elements should be taken into consideration:

Service water, e.g. plant effluent, should be used instead of drinking water where possible.

Boosting service water to a pressure of 0.6 – 1.0 MPa consumes 0.25 – 0.5 kWh/m³ power.

To avoid excessive net pressure, local booster pumps should be used where necessary.

Compressed air with a pressure of 0.6 – 1 MPa consumes around 0.1 kWh power per m³ suction volume.

Pipelines should have sufficient diameters to prevent excessive head loss. Of course, networks must be tight.

Heating also requires about 0.02 kWh power per 1 kWh of heat transfer.
Digesters and thermal dryers are by far the greatest heat consumers. However, by cogeneration from digester gas generates far more heat than required for digester operation (See Sludge Stabilization).

In hot climate, air conditioning may be necessary for some rooms, e.g. operator buildings, control rooms and labs. Heat pumps require only around 0.25 kWh power per 1 kWh heat. Adiabatic air conditioners use evaporation enthalpy for cooling and have low power consumption, but need clean water (effluent from MBR-systems is sufficient).
Good thermal insulation of buildings and equipment is essential for reducing heat and power consumption.

Heat consumption of digesters and pasteurization systems is reduced by raw sludge thickening and that for sludge drying is reduced by sludge dewatering.

Rooms must be ventilated to prevent explosive or hazardous atmospheres, or for odour nuisance. Power consumption of ventilation is 5 – 10 Wh/m³ air.

Ventilation during cold weather can require input air heating. Heat should be recovered as far as possible.

Some rooms need to be ventilated only at certain times, e.g. while operators are working therein. Timers or atmosphere monitors avoid over-ventilation.

Variable speed blowers should be used to permit controlled ventilation.

Air ducts should be as short as possible and designed for low head loss.

Encapsulation of equipment or other odour emission points avoids or reduces the need for ventilation.

Consumptions of power, water and chemicals for exhaust deodorization depend on the technology used.

Bio-chemical methods are generally preferable. Bio-filters and bio-scrubbers are relatively inexpensive, easy to operate and consume only 1.5 – 2.5 Wh/m³ power.

The most energy-efficient method is use of odorous air for biological wastewater treatment, e.g. feeding it into blowers of activated sludge plants or through trickling filters, provided that the odorous components are water soluble and biologically degradable, which is usually the case.

Odorous air can also be fed into thermal sludge dryers or incinerators. Exhaust air from dryers needs to be deodorized anyway, and combustion air is thermally oxidized.

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